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Medical Information

Nails and Systemic Disease

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Important diagnostic clues may be provided by changes in the nails. Because nail findings are easily observable and yield valuable information, attention to these features is often rewarding. Some of the nail changes that may be observed in systemic disorders are reviewed.

MANY SYSTEMIC DISORDERS leave their mark on the nails and, therefore, provide physicians with valuable clues to diagnosis. In spite of this knowledge, there has been relatively little attention paid to the nails, which is surprising in view of the fact that they are among the most accessible parts of the body and can be viewed with the naked eye, requiring no sophisticated equipment. Although similar findings occur on the fingernails and the toenails, the traumatic effects of shoes and more frequent mycotic infections make toenails less valuable for diagnosis.

Some of the more distinctive changes in the fingernails that have been observed in systemic disease are herein reviewed. Local disorders resulting from trauma, tumor and infection are well described in dermatologic literature and are not included here.

Nail Growth and Aging

Nails grow from the nail matrix, which is located approximately 3 to 4 mm proximal to the cuticle. The matrix and the nail bed are supplied with blood through the paired digital arteries, which provide a rich capillary loop system with many arteriovenous anastomoses. Nails grow approximately 0.1 mm per day, with more rapid growth in adolescence and a slower rate with aging. The dominant thumbnail tends to grow faster than the nondominant nail, and disease may slow nail growth. Pregnancy and hyperthyroidism are associated with increased rates of growth; starvation and lactation, with slower growth.[1]

The most detailed study of nail growth was reported by Bean.[2-4] In a remarkable effort spanning three decades, he observed the gradual slowing of his nail growth. In his early 30's the thumbnail grew from the cuticle to the free edge in 117 days; in his 50's the nail grew the same distance in 137 days. At the completion of his study ten years later, 144 days were required for the same nail growth. Seasonal changes in nail growth rate were not observed.

With aging, nails become ridged, more opaque, greyish in color and less flexible (Figure 1).

Longitudinal ridging appears in the early middle years, increasing with age, and may be aggravated by trauma, rheumatoid arthritis and peripheral vascular disease, among other conditions.

Handedness

The thumbnail may provide a clue to dominant handedness (Figure 2), a feature that might be of value in predicting the outlook of a comatose patient with a neurologic deficit. The dominant thumbnail has a wider base and the angles formed

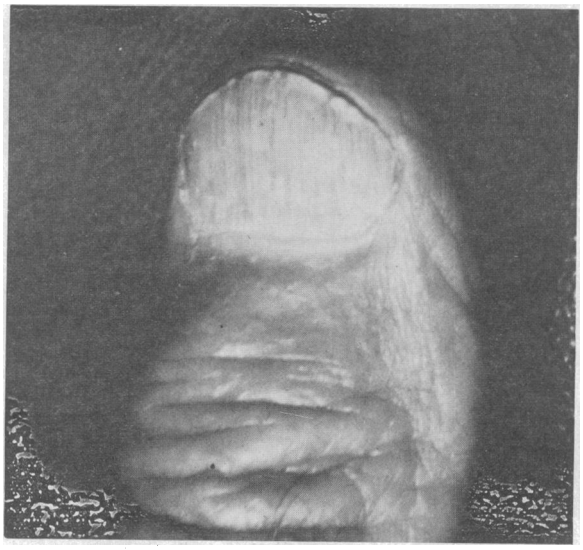

Figure 1.—Longitudinal ridging of nail in normal aging.

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by the base and the lateral aspects of the nail are more obtuse. When a trained observer judged handedness in a blind fashion (when fingernails were draped, and crossed or uncrossed according to a coin toss), handedness was identified correctly in the great majority of the subjects.[5]

Lunulae

The lunula or half-moon is present in most normal people. Lunulae are almost always found in the thumbnails, even when absent in the other nails. However, approximately 5 percent of presumably normal persons, usually older ones, do not have visible lunulae. A number of illnesses also may cause the loss of the lunulae: these include trauma to the terminal digit, multiple myeloma, scleroderma (Figure 3), bone tumors and hyperparathyroidism.

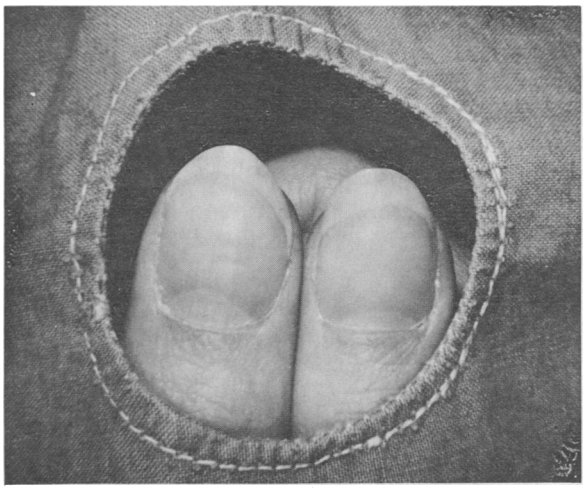

Figure 2.—Thumbs of left-handed person uncrossed. Note wider base and more obtuse angles at the corners of the dominant thumbnail.

Dystrophy

Dystrophy of the nails results from a variety of conditions—hereditary, congenital and acquired. Dystrophic nails are seen in persons who constantly traumatize their nails by biting or picking. Dystrophy may result from faulty manicuring. Such nails may present with irregular, transverse lines. Dystrophy of nails may also be secondary to dermatologic conditions which affect the terminal digits.

Punctate leukonychia, or small white spots on the nails resulting from incomplete keratinization of the nail plate, is found at some time in virtually all people and has no clinical importance.

The partial or complete absence of the nails that occurs in the nail-patella syndrome serves to alert one to the renal failure associated with this condition.

Mees Nail; Beau Nail

Mees nail (Figure 4) is characterized by a single, transverse, narrow whitish line that runs the width of the nail plate and is seen on multiple nails. The condition was originally described in arsenic poisoning but appears to be a legacy of remote, serious medical disorders, such as septicemia, dissection of the aorta, acute renal failure, sickle cell anemia in crisis and poisoning with heavy metals. The approximate number of days since the serious event occurred can be determined by measuring from the cuticle to the transverse line, adding 3 to 4 mm for that portion of the nail which is hidden between the matrix and the cuticle, then dividing by the estimated average daily nail growth of approximately 0.1 mm.

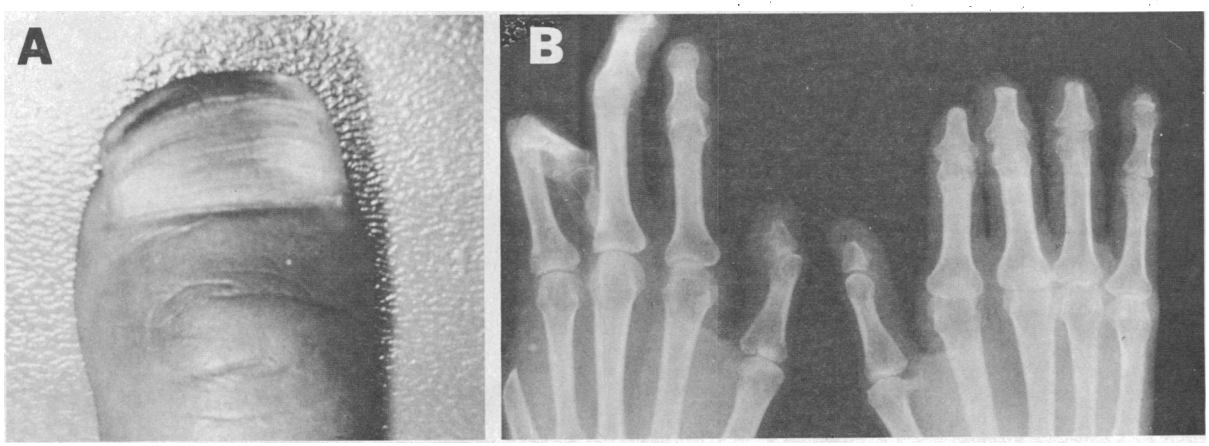

Figure 3.—A, Thumbnail of patient with scleroderma shows dystrophy and loss of lunula. B. Radiograph of hands of same patient shows bony abnormalities involving distal phalanges.

Beau nail, which displays a fault line appearance, is probably a more serious form of Mees nail that results from temporary arrest of growth at the nail matrix. In Beau nail, transverse deep depressions in the nail are seen, rather than the transverse white lines of Mees nail. The Beau line may indicate the same prior, serious medical events; the measurement is identical to that for Mees nail. Beau nail, like Mees nail, is seen at the cuticle edge approximately one month after the serious illness has occurred, as the average nail grows approximately 3 mm per month, the distance represented by the hidden area of nail growth.

Nail Pitting

In psoriasis, the nails are affected in approximately 25 percent to 50 percent of patients; in about 15 percent of these, permanent pitting occurs (Figure 5). In a patient with psoriasis whose cutaneous lesions have cleared, the presence of psoriatic arthritis is seldom considered, since such patients frequently forget to report a skin disease of the past, perceiving no connection of arthritis to that remote illness. However, the finding of pitted nails in an arthritic patient is of help in identifying psoriasis as a possible underlying cause of the articular disorder.

Rarely, nail pitting may be congenital, but the history of such nails since birth should avoid confusion with psoriatic nails.

Nails may occasionally be pitted as a result of neurotrophic conditions such as nerve damage. In such instances, the pits often clear with recovery.

The Reiter syndrome occasionally leads to pitting, but frequently the nails are surprisingly normal when the cutaneous lesions (keratodermia blennorrhagica) abate.

Clubbing

Clubbing of the nails has been of interest to physicians since its initial description by Hippocrates in empyema. It is known to occur in a variety of disparate conditions, only some of which have a common denominator. Many patients with clubbing such as those with cyanotic congenital heart disease have decreased arterial oxygen saturation; many others have some disturbance of pulmonary circulation. However, clubbing occurs in diseases as different as Crohn disease, ulcerative colitis, biliary cirrhosis, primary hypertrophic osteoarthropathy, cystic fibrosis and cancer of the esophagus. As with all diseases, the geographic distribution of illness should provide information, since the prevalence of a disease so often depends upon geography. For example, nail clubbing in northeastern Brazil is most often a manifestation of schistosomiasis of the lung which results in arteriovenous shunts decreasing arterial oxygen saturation.

Familial clubbing is unassociated with systemic disease and should offer no problem in differential diagnosis.

An objective assessment of the presence of clubbing can be obtained by measuring the ratio of the depth of the finger at the cuticle and also at the distal interphalangeal joint. The ratio is

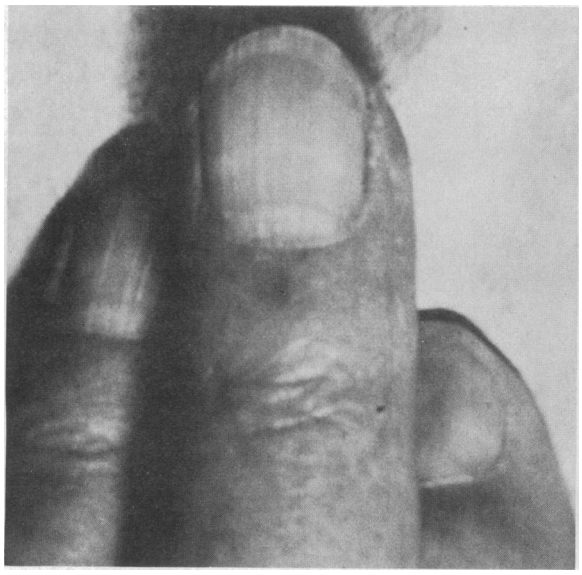

Figure 4.—Mees nail. Note transverse white line on middle of nail plate.

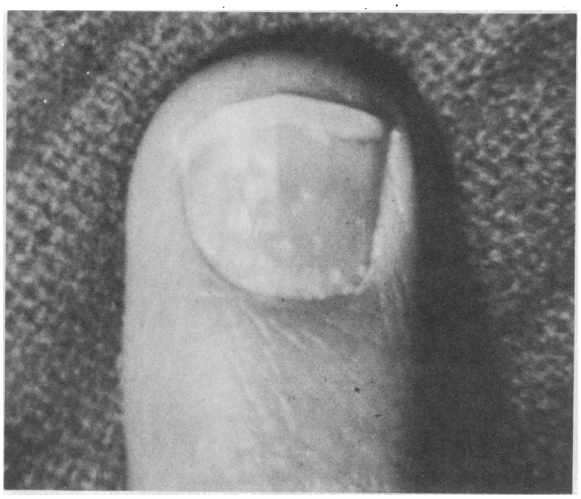

Figure 5.—Pitting of nails in patient with psoriasis.

greater than one in digital clubbing and less than one in normal subjects.[6] Clubbed nails have been observed to manifest more rapid growth than normal nails.[1]

Renal Disease

Certain findings in the nail give valuable clues about the presence of renal disease. The nail-patella syndrome has already been mentioned. What has been termed the half-and-half nail (Figure 6), in which the proximal portion is white and the distal portion has a deep reddish color, was first noted by Bean and Clifton,[1] and subsequently studied by Lindsay.[7] Of the 25 patients whom Lindsay identified with the half-and-half nail, 24 had azotemia; the remaining patient had cirrhosis.

In nephrotic syndrome, the fingernails may also undergo a distinctive change, consisting of single or multiple transverse whitish bands seen in the nail bed. These bands described by Muercke[8] were found in patients whose serum albumin was less than 2.2 grams per dl. The bands were most prominent in patients with severe and prolonged hypoalbuminemia from any cause, although most of the patients were nephrotic. The banding regressed and disappeared when the serum albumin was raised toward normal.

Multiple splinter hemorrhages have been noted in patients undergoing hemodialysis. In one series, 20 percent of patients on dialysis manifested this finding.[9]

Figure 6.—Half-and-half nail (Lindsay nail) of renal failure.

Liver Disease

In chronic liver disorders, certain characteristic changes also appear in the nails. In cirrhosis of the liver, the nail may appear completely pale. The white nail has a high specificity for liver disease; less than 7 percent of patients without hepatic disease manifest this finding.[1]

The nail in liver disease may take on the appearance of a wide, pale, proximal portion and a narrow, deep-red distal portion (Figure 7). This finding, termed the three-quarter, one-quarter nail (Terry nail) is frequently seen in chronic hepatic cirrhosis but is not specific for liver disease; it may be observed in normal subjects and in patients with peripheral vascular disease, Raynaud phenomenon, systemic lupus erythematosus and also in other connective tissue disorders. The nails may give a clue to the presence of two chronic liver disorders that are potentially reversible: Wilson disease and hemochromatosis. Bluish lunulae have been observed in Wilson disease; in hemochromatosis, a blackish pigment, presumably melanin, appears on the nails as it does on the skin.

Pigmentation of the Nails

In addition to hemochromatosis, nails may undergo a variety of color changes from various drugs as well as from conditions that cause melanin or other pigments to be deposited. In

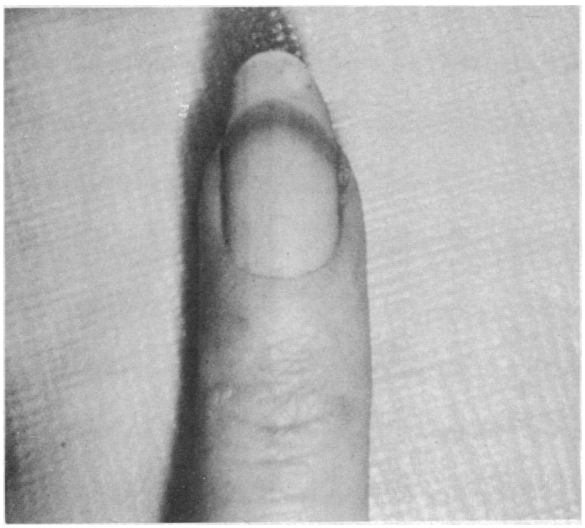

Figure 7.—Three-quarter, one-quarter nail of chronic liver disease shows distal band of deep color and larger, pale proximal area.

small cell carcinoma of the lung, adrenocorticotrophic hormone and melanin-stimulating hormone may be produced and may result in pigmentation of the nails as well as associated skin. Nail pigmentation may also be observed in Addison disease. With respect to drugs, tetracycline may produce a yellowish nail and chloroquine, a blue-black nail; adreamycin and cyclophosphamide[10] both have been reported to cause blackish nails. Argyria, which is a well-known cause of pigmentation of the gums, also results in a slate-grey color to the nails. Other causes of nail color change include industrial and cosmetic dyes, resorcin, pseudomonas infection, phenophthalein, and nicotine.

Blood Diseases

Chronic anemia produces a condition known as koilonychia, in which the nail becomes spoon-shaped. This condition is quite uncommon in developed countries but is seen with relative frequency in areas where chronic anemia, secondary to parasitic disease, is widespread. Hemorrhages under the nail plate are found in leukemic patients and in those with bleeding diatheses.

Miscellaneous Conditions

The yellow nail, which presents as a thick, opaque slow-growing nail, is seen in lymphatic blockage. Onycholysis, in which the distal portion of the nail is pulled away from the bed, is a sign of hyperthyroidism (Plummer nails) and also is found in hypothyroidism, in traumatic conditions, fungus disease, impaired circulation and psoriasis.

Connective Tissue Disorders

The diagnostic value of splinter hemorrhages (Figure 8) was mitigated following a report in which about 10 percent of hospital inpatients had this finding;[11] however, patients in hospital frequently harbor infections, vasculitis, renal failure and other diseases in which immune complexes are found. Immune complexes are thought to participate in the production of the subungual hemorrhages. An occasional splinter hemorrhage is of no diagnostic value and is often the result of trauma; however, multiple splinter hemorrhages, especially when trauma can be eliminated, increase their diagnostic value. Splinter hemorrhages in profuse numbers are found frequently in systemic lupus erythematosus, renal disease, rheumatoid arthritis, mixed connective tissue disease, vasculitic syndromes, bacterial endocarditis and trichinosis. They have also been observed in eosinophilic polymyositis.[12] These lesions, which involve the spirally wound capillaries, are deep in the hyponychia and give a positive benzidine test.[13]

Dermatomyositis causes an erythema of the distal nail folds (Figure 9). This condition is associated with hyperkeratotic thickening and roughening of the cuticles.[14]

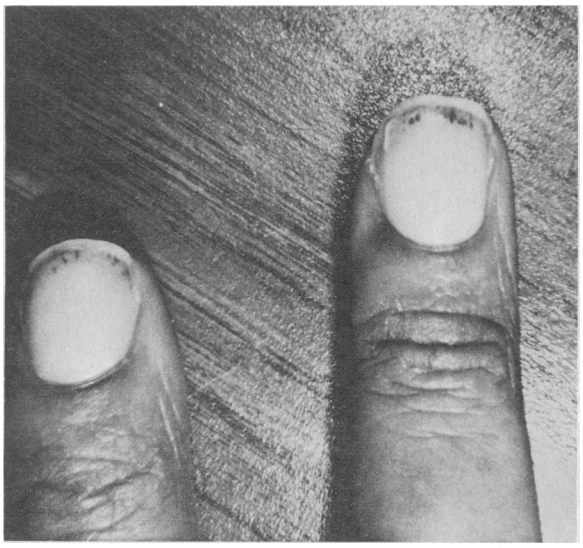

Figure 8.—Splinter hemorrhages in patient with vasculitis.

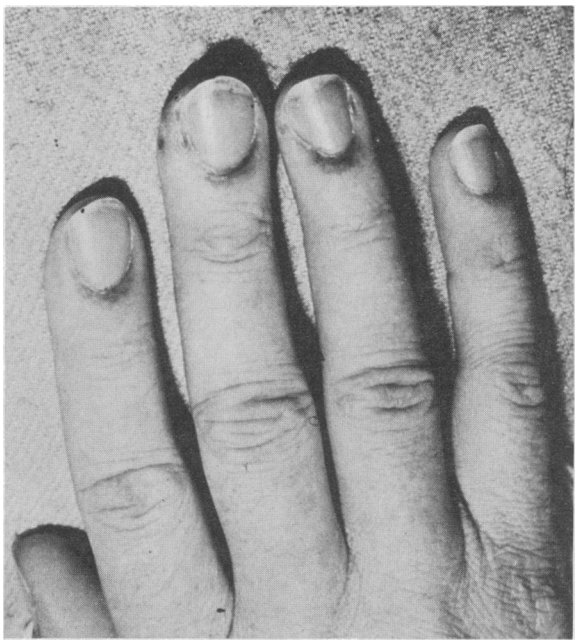

Figure 9.—Erythema of nail folds in patient with dermatomyositis.

The capillaries in the skin proximal to the cuticle can be viewed by the naked eye but are seen more clearly with a magnifying lens and a drop of oil. Giant capillary loops adjacent to areas with no capillaries are common to dermatomyositis and scleroderma and are rarely observed in other connective tissue disorders. The finding of giant capillary loops in a patient with Raynaud phenomenon is evidence that the condition is not innocent and that there may be an associated collagen disease.[15] These large capillary loops have also been observed in patients who develop a scleroderma-like disorder when exposed to polyvinyl chloride.[16] In systemic lupus erythematosus and rheumatoid arthritis, one may see an increased size of nail fold capillaries which have the appearance of a picket fence, but giant loops are rarely seen. In various disorders associated with arteritis, small infarcts about the nail folds occur. In such instances, an arteriogram of the hand will often show changes that are typical of vasculitis.

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Advantage of 'Pencil-Point' Needles in Reducing Postspinal Headaches

WE ARE LIMITED, or should be limited as much as possible, to 25-gauge spinal needles (when doing subarachnoid blocks) in order to avoid postpuncture headaches. It is a more difficult technique than it would be on a medical ward where large size needles such as an 18-gauge or a 20-gauge needle are frequently used. If one wishes, instead of using a 25-gauge spinal needle, without increasing the risks of postpuncture headaches, one can use pencil-point type needles such as the Whitacre needle—which is commercially available. The advantage of the Whitacre needle is that it has the rigidity of a 22-gauge needle, but separates the fibers rather than cuts them and hence this diminishes the incidence of postpuncture headaches to that of the level of a 25-gauge spinal needle.

—WILLIAM GOTTSCHALK, MD, *Chicago*

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